MidAmerican ENERGY
OBSESSIVELY, RELENTLESSLY AT YOUR SERVICE®

# MidAmerican Business Audit

**Performed by:**

**The Energy Group**

***Acct. Number:*** *47710-15054*
***Gas Meter:*** *AY0754966*
***Electric Meter:*** *S64098552*

***Audit Date:*** *July 23, 2009*
***Business Type:*** *Office*
***TEG Employee:*** *Eric Biederman*
***Approximate Square Footage:*** *10,000*

**Customer Information:**
***Name:*** *Black Hawk Co. Conservation* ***Contact:*** *Vern Fish*
***Address:*** *1346 W Airline Hwy* ***Title:*** *Director*
*Waterloo, IA 50307* ***Phone Number:*** *319-266-6813*

Save some green.SM

## Executive Summary:

This energy analysis was undertaken at the request of Vern Fish, City of Black Hawk County Conservation Board, to identify cost-effective opportunities to reduce facility energy costs. The analysis of the facility uncovered energy improvement opportunities in the area of lighting, heat equipment, and cooling equipment.

There are T-12 fluorescent fixtures found in the lower level of the facility. Retrofitting these fixtures with T-8 lamps and ballasts will reduce the amount of energy being used by these fixtures. There are also standard incandescent lamps found in the facility. Retrofitting these with compact fluorescent lamps will reduce the amount of energy being used by the lamps.

The building's heating and air conditioning unit are both original to the building and as they continue to age considerations should be given to replacing them with high efficiency equipment to reduce energy consumption.

The average natural gas cost is **$1.00**/therm.
The average "avoided" electric cost is **$0.057**/kWh.

*Questions regarding report or rebates can be answered by calling MidAmerican Energy at* ***1-800-318-8915.***

**Energy-Savings Summary**

| Description of Improvement | Estimated Annual Energy Savings | Estimated Implementation Cost | Simple Payback Years | Estimated MidAmerican Rebate |
|---|---|---|---|---|
| **Compact Fluorescent Lighting** | $17.67 | $25.00 | 0.85 | $10.00 |
| **8' Fluorescent Lighting** | $54.17 | $1,530.00 | 10.30 | $972.00 |
| **Heating System** | $456.52 | $3,000.00 | 6.57 | TBD |
| **Cooling System** | $388.27 | $3,000.00 | 7.73 | TBD |
| **Total** | **$916.63** | **$7,555.00** | **7.17** | **$982** |

****Actual rebate amounts will be determined once final project costs are submitted****

**** Simple Payback in Years = Project cost less MidAmerican rebate divided by savings.****

# Window Replacement and Recommendations

| | |
|---|---|
| ***Current Windows:***<br>The building's windows are double paned windows. The windows are vinyl, sliding windows. The windows and seals appeared to be in good condition. | ***Windows Recommendations:***<br>There are no recommendations at this time.<br><br>***If Recommended…***<br>***This may be eligible for a rebate through MidAmerican Energy. A "BusinessCheck Custom Systems Project Pre-Approval Application" has been included for your convenience. This program does however require Pre-Approval through MidAmerican Energy. Please call 1-800-318-8915 with any questions you may have.*** |

**Single Pane Window**

**Double Pane Window**

Calculator

| Window Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Windows** | N/A | N/A | N/A | N/A | N/A |

# ***Weatherstripping Recommendations***

| ***Current Weatherstripping:*** | ***Weatherstripping Recommendations:*** |
|---|---|
| The weatherstripping on the entry doors appeared to be in good condition. | There are no recommendations at this time. |
| *One test for effectiveness of current weatherstripping is to place your fingers along any exterior seams. If there is a significant draft or any daylight showing, the weatherstripping should be replaced. Replacing your weatherstripping is a very inexpensive way to lower your utility bills. The payback on replacing weatherstripping can be expected to take less than one year.* | ***Please refer to enclosed calculator for references to calculations if recommended.*** |

Calculator

| Improved Weatherstripping Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Weatherstripping** | N/A | N/A | N/A | N/A | N/A |

# ***Wall Insulation and Recommendations***

| | |
|---|---|
| ***Current Wall Insulation:***<br>The exterior of the building is masonry. Metal has been added to the exterior of the walls on the sides and rear of the building. Only the second floor of the building has had metal installed on the exterior. The interior walls have been framed and insulation has been added. At the time of the walk through, we were unable to determine the amount of insulation found in the exterior walls in some areas because the walls are finished on the inside. We believe the walls have an estimated average R-value of R-18 or greater based on the total thickness of the walls. | ***Recommended Wall Insulation:***<br>There are no recommendations at this time.<br><br>Note: BusinessCheck participants will be eligible for rebates of $0.04 per R-value added per square foot for insulation upgrades up to the State of Iowa Code. |
| | ***Please refer to enclosed calculator for references to calculations if recommended.*** |
| | ***If recommended, please see Energy-Savings Summary located at the front of this report for rebate amount. A "BusinessCheck Insulation Completion" form has been included for your convenience. Please contact MidAmerican at 1-800-318-8915 before installing the insulation for information regarding the rebate process. The actual rebate can be determined when your final project costs are submitted.*** |

Calculator

| Wall Insulation Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Wall Insulation** | N/A | N/A | N/A | N/A | N/A |

# ***Roof or Ceiling Insulation and Recommendations***

***Current Ceiling Insulation:***
The building's roof is a sloped metal roof. There is blanket insulation located between the support beams. The blanket insulation is approximately 4 inches thick and has an R-value of approximately R-12. There is also batt insulation on top of the drop ceiling tiles. The insulation is 6 inches thick and has an R-value of R-18. The existing insulation is adequate.

***Recommended Ceiling Insulation:***
There are no recommendations at this time.

Note: BusinessCheck participants will be eligible for rebates of $0.04 per R-value added per square foot for insulation upgrades up to the State of Iowa Code, not to exceed 50% of the installed cost. Ceiling/Attic insulation upgrades above the Iowa Code will be eligible for rebates of $0.02 per R-value added per square foot up to a total R-value of R-30. Insulation above R-30 will not be eligible for a rebates.

***Please refer to enclosed calculator for references to calculations if recommended.***

***If recommended, please see Energy-Savings Summary located at the front of this report for rebate amount. A "BusinessCheck Insulation Completion" form has been included for your convenience. Please contact MidAmerican at 1-800-318-8915 before installing the insulation for information regarding the rebate process. The actual rebate can be determined when your final project costs are submitted.***

Calculator

| Ceiling Insulation Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Ceiling Insulation** | N/A | N/A | N/A | N/A | N/A |

# ***Compact Fluorescent Lighting Recommendations***

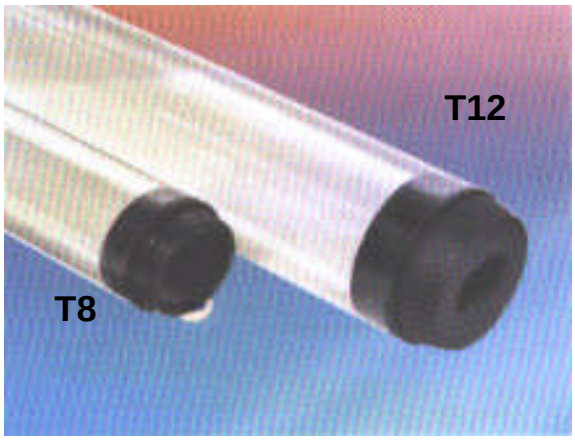
| | |
|---|---|
| ***Current Lighting:***<br>The only source of incandescent lighting in the facility is in the entry way. There are five 40-watt lamps used in the entry fixture. | ***Recommendations:***<br>We recommend replacing your remaining incandescent lighting with the equivalent sized compact fluorescent lamps.<br><br>These lamps will last up to 10 times longer than incandescent lamps and also radiate less heat than standard incandescent.<br><br>A "Pre-Approved Lighting Rebate Project Completion/Verification" form has been included for your convenience. After purchasing the lights, please complete the form and mail it with associated invoices to the address listed. |
| | ***Please refer to enclosed calculator for references to calculations if recommended.*** |
| *If every household in the U.S. replaced one light bulb with a compact fluorescent light bulb (CFL), it would prevent enough pollution to equal removing one million cars from the road. CFL's use 66% less energy than a standard incandescent bulb and last up to 10 times longer.* | ***May be eligible for a MidAmerican lighting rebate. A "BusinessCheck Lighting Equipment Completion" form has been included. Please contact MidAmerican at 1-800-318-8915 before installing lights for information regarding the lighting rebate process. The actual rebate can be determined when your final project costs are submitted.*** |

Calculator

| Lighting Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Lighting** | $17.67 | $25.00 | 0.85 | 310 | N/A |

# ***Fluorescent Lighting Recommendations***

| | |
|---|---|
| ***Current Lighting:***<br>The lighting on the second floor of the building consisted of energy efficient T8 fluorescent lighting. The first floor of the building use standard efficiency fluorescent lighting.<br><br>The following standard efficiency F98T12 fluorescent fixtures were found during the audit:<br><br>2-lamp fixtures: 18 | ***Recommendations:***<br>We recommend retrofitting all of the standard efficiency T-12 fixtures found throughout the building with the equivalent higher efficiency T-8 lamps and ballasts. It is also recommended that the fixture be converted to a four lamp fixture. The T-8 system provides the same amount of light, but consumes up to 30% less energy.<br><br>A "Pre-Approved Lighting Rebate Project Completion/Verification" form has been included for your convenience. After purchasing the lights, please complete the form and mail it with associated invoices to the address listed.<br><br>***Please refer to enclosed calculator for references to calculations if recommended.***<br><br>***May be eligible for a MidAmerican lighting rebate. A "BusinessCheck Lighting Equipment Completion" form has been included. Please contact MidAmerican at 1-800-318-8915 before installing lights for information regarding the lighting rebate process. The actual rebate can be determined when your final project costs are submitted.*** |

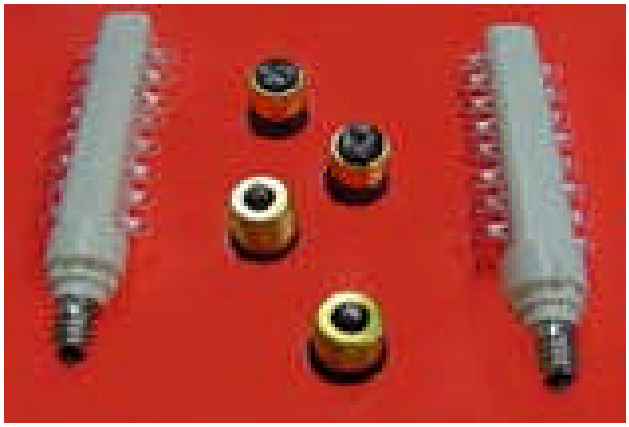



Calculator

| Lighting Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **8' Fluorescent Lighting** | $54.17 | $1,530.00 | 10.30 | 950 | N/A |

# ***Exit Sign Recommendations***

| ***Current Lighting:*** | ***Recommendations:*** |
|---|---|
| The exit signs throughout the building use energy efficient LED lamps. Each LED lamps uses approximately 1.2 watts. | There are no recommendations at this time. |
| | ***Please refer to enclosed calculator for references to calculations if recommended.*** |
| | ***May be eligible for a MidAmerican lighting rebate. A "BusinessCheck Lighting Equipment Completion" form has been included. Please contact MidAmerican at 1-800-318-8915 before installing lights for information regarding the lighting rebate process. The actual rebate can be determined when your final project costs are submitted.*** |
| *Retrofit incandescent exit signs with exit signs that use LED's. LED's use a lot less energy in comparison and last much loner then conventional incandescent bulbs.* | |

Calculator

| Exit Sign Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Exit Signs** | N/A | N/A | N/A | N/A | N/A |

# ***Heating Systems***

***Current Systems:***
The heating for the facility is provided by two Reznor furnaces and a Heil furnace. The model information could not be verified on the Reznor units; however the estimated size of each units is 150,000 Btu/hr. The estimated efficiency of the units is 80%. The age of the equipment was not known. The Heil furnace is a DC90 UltraHigh Efficiency model. The unit has a 125,000 Btu heating capacity. The estimated efficiency of the Heil furnace is 90%. The age of the furnace was not known.

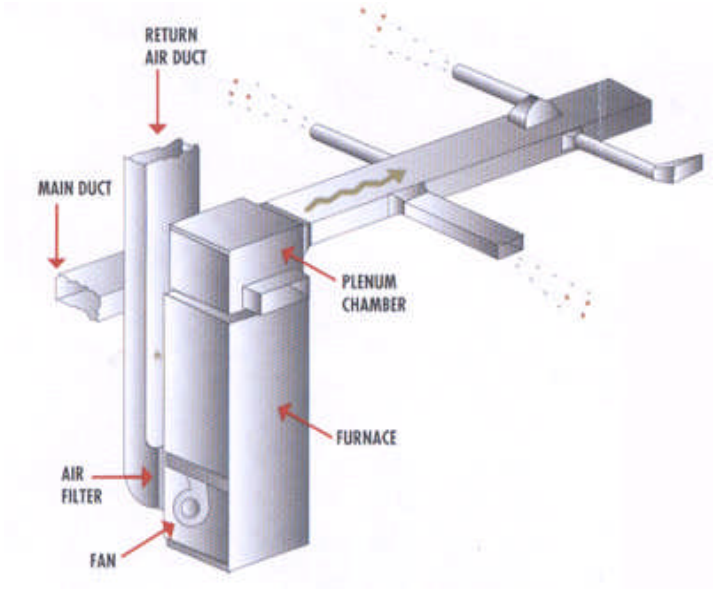
*Heating, Ventilating, and Air Conditioning (HVAC) may be your organizations biggest user of energy. Did you know changing out old cooling and heating equipment with higher efficiency models can cut your annual energy costs by 20%. Remember that getting the proper size and a quality installation is essential to getting the most from your new equipment.*

***Recommendations:***
Consideration should given to replacing the Reznor furnaces with high efficiency furnaces at the normal time of replacement. The equipment should also be inspected annual to maintain the equipment's efficiency and safety.

Please note that the savings and project cost listed below are the incremental cost and savings from upgrading from standard efficiency equipment to high efficiency equipment.

***Please refer to enclosed calculator for references to calculations if recommended.***

***May be eligible for a MidAmerican heating and cooling rebate. A "BusinessCheck Heating and Cooling Equipment Completion" form has been included. Please contact MidAmerican at 1-800-318-8915 before installing the equipment for information regarding the rebate process. The actual rebate can be determined when your final project costs are submitted.***

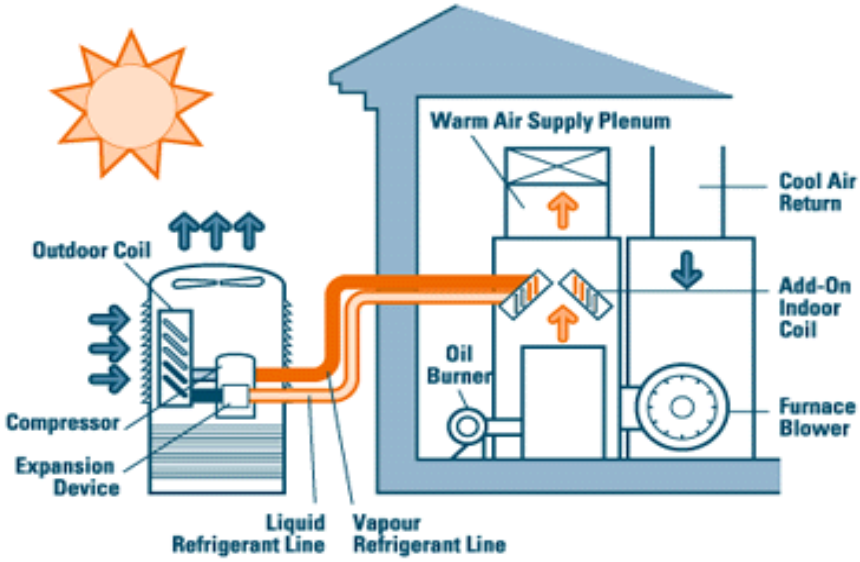



Calculator

| Heating Systems Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Heating Systems** | $456.52 | $3,000.00 | 6.57 | N/A | 457 |

# Cooling Systems

| | |
|---|---|
| ***Current Systems:***<br>The cooling for the facility is provided by three central air conditioning units. Two of the air conditioning units are Lennox models. One of the units has a 5 ton cooling capacity and the other has a 4 ton cooling capacity. The estimated efficiency rating of the units is estimated at 10 SEER. There is also a Heil central air conditioning unit. The Heil unit has a 4 ton cooling capacity. The Heil unit's estimated efficiency is 11 SEER. The age of the central air conditioning units was not known. | ***Recommendations:***<br>Consideration should given to replacing the central air conditioning units with high efficiency equipment at the normal time of replacement. The equipment should also be inspected annual to maintain the equipment's efficiency and safety.<br><br>Please note that the project cost listed below is the incremental cost from upgrading from standard efficiency equipment to high efficiency equipment. |
| | ***Please refer to enclosed calculator for references to calculations if recommended.*** |
| *Heating, Ventilating, and Air Conditioning (HVAC) may be your organizations biggest user of energy. Did you know changing out old cooling and heating equipment with higher efficiency models can cut your annual energy costs by 20%. Remember that getting the proper size and a quality installation is essential to getting the most from your new equipment.* | ***May be eligible for a MidAmerican heating and cooling rebate. A "BusinessCheck Heating and Cooling Equipment Completion" form has been included. Please contact MidAmerican at 1-800-318-8915 before installing the equipment for information regarding the rebate process. The actual rebate can be determined when your final project costs are submitted.*** |

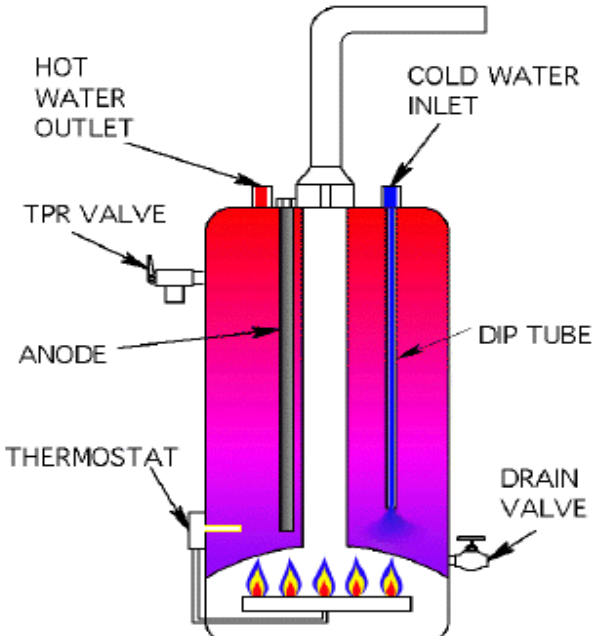



Calculator

| Cooling Systems Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Cooling Systems** | $388.27 | $3,000.00 | 7.73 | 6,933 | N/A |

# ***Water Heaters***

| | |
|---|---|
| ***Current Systems:***<br>The domestic hot water is provided by a Richmond natural gas model water heater. The unit has a 40 gallon storage capacity. The water heater was installed in 2006. | ***Recommendations:***<br>There are no recommendations at this time. |
| | ***Please refer to enclosed calculator for references to calculations if recommended.*** |
| *Heating, Ventilating, and Air Conditioning (HVAC) may be your organizations biggest user of energy. Did you know changing out old cooling and heating equipment with higher efficiency models can cut your annual energy costs by 20%. Remember that getting the proper size and a quality installation is essential to getting the most from your new equipment.* | ***May be eligible for a MidAmerican heating and cooling rebate. A "BusinessCheck Pre-approved Heating and Cooling Equipment Completion" form has been included. Please contact MidAmerican at 1-800-318-8915 before installing the equipment for information regarding the rebate process. The actual rebate can be determined when your final project costs are submitted.*** |




Calculator

| Water Heater Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Water Heater** | N/A | N/A | N/A | N/A | N/A |

# ***Temperature Setback/Setup***

***Current Systems:***
The building's temperature is currently set back because the building is unoccupied. There are programmable thermostats and they will be programmed to set back/up the temperature when the building is unoccupied.

*Superior energy management is good business. Recent research suggests that leaders in energy management are able to achieve superior financial performance. Whether your business is commercial, industrial, or institutional, energy is part of your value chain and managing it strengthens your bottom line.*

***Recommendations:***
There are no recommendations at this time.

Note: We generally recommend a setback of 8-10 degrees; actual temperature setting will differ depending on your organizations requirements.

***Please refer to enclosed calculator for references to calculations if recommended.***

***May be eligible for a MidAmerican heating and cooling rebate. A "BusinessCheck Heating and Cooling Equipment Completion" form has been included. Please contact MidAmerican at 1-800-318-8915 before installing the equipment for information regarding the rebate process. The actual rebate can be determined when your final project costs are submitted.***

Calculator

| Temperature Setback Energy-Savings Summary | | | | | |
|---|---|---|---|---|---|
| **Description of Improvement** | **Estimated Annual Energy Savings** | **Estimated Implementation Cost** | **Simple Payback Years** | **Estimated Annual kWh Saved** | **Estimated Annual Therms Saved** |
| **Thermostat Setback** | N/A | N/A | N/A | N/A | N/A |

MidAmerican ENERGY
OBSESSIVELY, RELENTLESSLY AT YOUR SERVICE®

# MidAmerican Business Audit

**Performed by:**

**The Energy Group**

| Energy Savings Summary | | | | | | |
|---|---|---|---|---|---|---|
| Description of Improvement | Estimated Annual Energy Savings | Estimated Implementation Cost | Simple Payback Years | Estimated Annual kWh Saved | Estimated Annual Therms Saved | Rebate amount |
| 8' Fluorescent Lighting | $54.17 | $1,530.00 | 10.30 | 950 | N/A | $ 972.00 |
| Compact Fluorescent Lighting | $17.67 | $25.00 | 0.85 | 310 | N/A | $ 10.00 |
| Total | $71.84 | $1,555.00 | 21.64 | 1,260 | N/A | |

**Avoided Cost Rate** $ 0.057

## *Recommended F32T8 Fluorescent Lighting*

| Lighting Description | Fixture Quantity | Total Wattage by Fixture | | | Current | New | Energy Consumption (kWh) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Proposed | Reduction | Annual/Hrs | Annual/Hr. | Current | Proposed | Savings | Annual Savings |
| F96T12 2-lamp-Change existing lamps and ballasts to F32T8 4-lamp - Retrofit | 18 | 2,664 | 1,872 | 792 | 1,200 | 1,200 | 3,197 | 2,246 | 950 | $54.17 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| **Total** | **18** | **2,664** | **1,872** | **792** | | | **3,197** | **2,246** | **950** | **$54** |

| | | | | | |
|---|---|---|---|---|---|
| *8' kWh Savings* | *950* | *8' Savings* | $54.17 | *8' Improvements* | $1,530.00 |
| *4' kWh Savings* | *N/A* | *4' Savings* | N/A | *4' Improvements* | N/A |

Back to Main Page

## *Recommended Compact Fluorescent Lighting*

| Lighting Description | Fixture Quantity | Total Wattage by Fixture | | | Current Annual/Hrs | New Annual/Hr. | Energy Consumption (kWh) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Current | Proposed | Reduction | | | Current | Proposed | Savings | Annual |
| 40 watt incandescents replace with 9 watt compact fluorescents | 5 | 200 | 45 | 155 | 2,000 | 2,000 | 400 | 90 | 310 | $17.67 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| **Total** | **5** | **200** | **45** | **155** | | | **400** | **90** | **310** | **$18** |

| | |
|---|---|
| ***Cost of Improvements*** | **$25.00** |
| ***Estimated Rebate*** | **$10.00** |

Back to Main Page

MidAmerican ENERGY
OBSESSIVELY, RELENTLESSLY AT YOUR SERVICE®

# MidAmerican Business Audit

**Performed by:**

**The Energy Group**

## *Potential Savings per Update Heating System*

Back to Main Page

| Current Est. Eff. | Proposed Efficiency | Current Therms | Current HW Heating Therms | Total Space Heat Therms | Annual Space Heat Therms/Saved |
|---|---|---|---|---|---|
| 80% | 92% | 3500 | 0 | 3500 | **457** |

Furnaces
rated in AFUE

Assumes ceiling insulation has already been installed (furnaces)

Input cells
Constants

| | |
|---|---|
| **Total Therms Saved** | **457** |
| **Price per Therm** | **$1.00** |
| **Total Annual Savings** | **$456.52** |
| **Cost of Improvements** | **$3,000.00** |

MidAmerican ENERGY
OBSESSIVELY, RELENTLESSLY AT YOUR SERVICE®

# MidAmerican Business Audit

**Performed by:**

**The Energy Group**

## *Potential Savings per Updating Cooling System*

Back to Main Page

Input items are indicated in boxes below.

| | |
|---|---|
| | Input cells |
| | Constants |

| | |
|---|---|
| Electric Energy Rate ($/KWH) = | $0.0560 |
| Demand Charge ($/KW) = | $0.00 |
| Number Months for Demand = | 4 |

| | EER | Input watts |
|---|---|---|
| Efficiency of original A.C. equipment = | 9.0 | 17333 |
| Efficiency of proposed A.C. equipment = | 15.0 | 10400 |

| | | |
|---|---|---|
| Nominal tonnage of existing AC equipment = | 13 | tons |
| Btuh cooling capacity of equipment = | 156000 | btuh |
| Nominal tonnage of proposed AC equipment = | 13 | tons |
| Btuh cooling capacity of equipment = | 156000 | btuh |

Total number of full load cooling hours (5,000 to 1,400 hrs/yr) = 1000

| | | |
|---|---|---|
| Annual energy savings = | 6933 | KWH |
| Cost / KWH = | $0.056 | |
| Annual KWH savings = | $388.27 | |
| Peak Demand Reduction = | 6.9 | |
| Cost / KW = | $0.00 | |
| # Summer Months = | 4 | |
| Annual KW savings = | $0.00 | |
| Total Annual Electric Savings = | $388.27 | |

| | |
|---|---|
| **Total kWh's Saved** | **6,933** |
| **Price per kWh** | **$0.056** |
| **Total Annual Savings** | **$388.27** |
| **Cost of Improvements** | **$3,000.00** |